WHAT IS CLAIMED IS:

1. A method of measuring a thickness of a tissue, the method comprising:

reflecting three wavelengths of light from the tissue by directing a measurement light beam along an optical path toward the tissue;

measuring an interference signal for each of the three wavelengths of the reflected light; and

determining a separation distance between positions of at least two reflecting tissue surfaces along the optical path by combining the measured signals.

2. The method of claim 1 wherein the measurement light beam comprises three wavelengths simultaneously directed along the path toward the tissue and wherein three interference signals are measured simultaneously.

3. The method of claim 1 further comprising determining a frequency component of a Fourier series from the interference signal of each of the three wavelengths.

4. The method of claim 3 further comprising:

transforming the measured the frequency components of the Fourier series to spatial components, the spatial components describing positions and intensities of the light beam reflected from the tissue along the optical path.

5. The method of claim 1 further comprising determining a tomography of the tissue by directing the measurement beam to several locations of the tissue, the locations having at least two reflecting tissue surfaces along the optical path.

6. The method of claim 5 further comprising:

scanning the light beam from a first location to a second location, wherein the first location and the second location are among the locations used to determine the tomography of the tissue.

7. A method of treating a tissue, the method comprising:

directing an ablative light beam to the tissue to form a desired shape in the tissue;

reflecting three wavelengths of light from the tissue by directing a measurement light beam along an optical path toward the tissue;

measuring an interference signal for each of the three wavelengths of the reflected light; and

determining positions of at least two reflecting tissue surfaces along the optical path by combining the measured signals while the ablative light beam is directed toward the tissue;

8. The method of claim 7 wherein the measurement light beam comprises three wavelengths simultaneously directed along the path toward the tissue and wherein three interference signals are measured simultaneously.

9. The method of claim 7 further comprising determining a frequency component of a Fourier series from the interference signal of each of the three wavelengths.

10. The method of claim 9 further comprising:

transforming the measured the frequency components of the Fourier series to spatial components, the spatial components describing positions and intensities of the light beam reflected from the tissue along the optical path.

11. A method of treating a tissue, the method comprising:

directing an ablative beam for ablating the tissue via a scanning device to the tissue;

directing a measurement beam for measuring a profile of the tissue via the scanning device to the tissue, wherein a path of the ablative beam and a path of the measurement beam are substantially concentric as directed onto the tissue.

12. The method of claim 11 wherein the path of the ablative beam and the path of the measurement beam are substantially coaxial as directed onto the tissue.

13. The method of claim 11 further comprising measuring of the tissue intermittently at time intervals between instances of ablation.

14. The method of claim 11 wherein the measurement beam is directed to the tissue via the scanning device for measuring a thickness of the tissue.

15. A system for measuring a thickness of a tissue, the system comprising:

a light source emitting a measurement light beam, the measurement light beam directed along an optical path toward the tissue, three wavelengths of the light beam reflecting from the tissue;

an interferometer generating an interference signal for each of the three wavelengths of the measurement light beam reflected from the tissue; and

a processor determining a separation distance between positions of at least two reflecting tissue surfaces along the optical path by combining the interference signals.

16. The system of claim 15 wherein the measurement light beam comprises three wavelengths simultaneously directed along the path toward the tissue and wherein three interference signals are measured simultaneously.

17. The system of claim 15 wherein the interference signal of each of the three wavelengths is used to determine a frequency component of a Fourier series.

18. The system of claim 17 wherein the processor transforms the frequency components of the Fourier series to spatial components, the spatial components describing positions and intensities of the light beam reflected from the tissue along the optical path.

19. The system of claim 18 further comprising an optical system directing the measurement beam to several locations of the tissue so as to determine a tomography of the tissue, the locations having at least two reflecting tissue surfaces along the optical path.

20. The system of claim 19 further comprising:

wherein the optical system scans the light beam from a first location to a second location, and wherein the first location and the second location are among the locations used to determine the tomography of the tissue.

21. A system for treating a tissue, the system comprising:

an ablative light source emitting an ablative light beam;

a light source emitting a measurement light beam, the measurement light beam directed along an optical path toward the tissue, three wavelengths of the light beam reflecting from the tissue;

an interferometer generating an interference signal for each of the three wavelengths of the measurement light beam reflected from the tissue; and

a processor controlling the ablative light beam and determining positions of at least two reflecting tissue surfaces along the optical path by combining the interference signals.

22. The system of claim 21 wherein the measurement light beam comprises three wavelengths simultaneously directed along the path toward the tissue and wherein three interference signals are measured simultaneously.

23. The system of claim 21 wherein the interference signal of each of the three wavelengths is used to determine a frequency component of a Fourier series and wherein the processor transforms the frequency components of the Fourier series to spatial components, the spatial components describing positions and intensities of the light beam reflected from the tissue along the optical path.

24. An apparatus for ablating tissue, the apparatus comprising:

an ablative light source producing an ablative light beam;

a measurement light source producing a measurement light beam; and

a scanner receiving the ablative beam from the ablative light source and the measurement beam from the measurement light source, the scanner including optical elements for directing the ablative beam and the measurement beam to locations across the tissue so as to ablate the tissue with the ablative beam and measure a profile of the tissue with the measurement beam, a path of the ablative beam and a path of the measurement beam being substantially concentric at the tissue.

25. The apparatus of claim 24 wherein the path of the ablative beam and the path of the measurement beam are substantially coaxial as directed onto the tissue.

26. The apparatus of claim 24 further comprising a processor electrically connected with the ablative light source and the measurement light source, the processor controlling of the ablative light beam and the measurement light beam.

27. An apparatus for treating tissue comprising:

an ablative light source producing an ablative beam;

a beam delivery device directing the ablative beam onto a tissue;

a microscope having a viewing port; and

an optical pachymeter emitting a measurement light beam directed along an optical path toward the tissue, three wavelengths of the light beam reflecting from the tissue, the optical pachymeter comprising an interferometer generating an interference signal for each of the three wavelengths of the measurement light beam reflected from the tissue, the pachymeter including a processor determining a separation distance between positions of at least two reflecting tissue surfaces along the optical path by combining the interference signals.

28. The ablation apparatus of claim 27 wherein the measurement light beam comprises three wavelengths simultaneously directed along the path toward the tissue and wherein three interference signals are measured simultaneously.

29. The ablation apparatus of claim 27 wherein the interference signal of each of the three wavelengths is used to determine a frequency component of a Fourier series and wherein the processor transforms the frequency components of the Fourier series to spatial components, the spatial components describing positions and intensities of the light beam reflected from the tissue along the optical path.

30. A method of measuring a separation distance between positions of at least two reflections along an optical path, the method comprising:

reflecting at least three wavelengths of light at the positions by directing a measurement light beam along the optical path;

measuring an interference signal for each of the at least three wavelengths of the reflected light; and

determining the separation distance between the positions of the at least two reflections along the optical path by combining the interference signals.